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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/689,618	10/22/2003	Takuichi Arai	07057.0055	4798

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EXAMINER

VIJAYAKUMAR, KALLAMBELLA M

ART UNIT	PAPER NUMBER
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1751

DATE MAILED: 12/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/689,618

Applicant(s)

ARAI, TAKUICHI

Examiner

Kallambella Vijayakumar

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 7, 9, 11 and 13 is/are rejected.
- 7) ☒ Claim(s) 5-6, 8, 10 and 12 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claims 1-13 are currently pending with the application.

The examiner has considered the IDS filed 03/25/05, 12/02/2003 and 10/22/2003.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 4, 9 and 11 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "strong acid" in claims 4, 9 and 11 is a relative term which renders the claim indefinite.

The term " strong acid " is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Although the applicants give examples of the strong acid, it is not clear which acids and/or what strength/concentration of acids are encompassed by this limitation.

It is suggested to recite the acids from the disclosure in the form of a Markush group to overcome this rejection.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

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1. Claims 1-3 are rejected under 35 U.S.C. 102(b) as being anticipated by McEnvoy (US 3,401,099).

The prior art teaches an electrode with a membrane films of colloidal clay such as bentonite or montmorillonite with a thickness of 1-250 microns and in contact with the an electrolyte of 30% sulfuric acid, whereby the crosslinking of the clay particles be anticipated and proton conductivity will be inherent because the prior art membrane is identical to that by the applicants, and identical compositions have identical properties (Col-4, Ln 62-64; Col-5, Ln 3-49). The presence of acid sites and the sulfo groups on the surface of the clay will be inherent due to the modification of clay by the sulfuric acid. With regard to the limitation of process step in claim-2, "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 64, 966 (Fed. Cir. 1985). All the limitations of the instant claims are met.

The reference is anticipatory.

2. Claims 1-3 and 7 are rejected under 35 U.S.C. 102(b) as being anticipated by Kerres et al (DE19919881 or WO 00/77080).

The US Publication 2002/0094466 is being used as English Translation of the DE and WO Publications in the present rejection.

The prior art teaches a proton conductive membrane, comprising a layered clay mineral powder which is a cation exchanger or an anion exchanger, and a first cross-linking structure including an -O-SO₂-O- group which crosslinks particles of the layered clay mineral powder (Abstract, Pg-3, Para 0036; Pg 4, Para 0040 and 0042; Pg 6-7, Claims 1-5). The presence of sulfo groups on the surface of the particle per claim-3 is anticipated over the presence of sulfuric acid modifier in the composition. With regard to method claim-7, this prior art also discloses making of a proton conductive membrane by preparing a spreading solution including layered clay mineral powder, which is a cation exchanger

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or an anion exchanger, and a modifying agent such as sulfuric acid, spreading the solution on a substrate forming a liquid membrane is formed, and removing the solvent from the liquid membrane by drying, wherein the components and the process steps of the prior art are identical to those claimed by the applicants (Pg-5, Para 0059, 0064). All the limitations of the instant claims are met.

The reference is anticipatory.

3. Claims 1-3 are rejected under 35 U.S.C. 102(b) as being anticipated by Fukuda et al (WO 02/15313).

The US Patent 6,844,097 issued to Fukuda et al is being used as the English Translation of WO Publication in the present rejection.

The prior art teaches a proton-conducting electrolyte membrane comprising a dispersion of phyllosilicate particles in a polymer (Abstract). The phyllosilicates include sulfuric acid treated smectite that meets the limitation of crosslinked by sulfo groups, while the presence of acid sites and the sulfo groups on the surface of the clay will be inherent due to the modification of clay by the sulfuric acid (Col-3, line 55 to col-4, line-2). All the limitations of the instant claims are met.

The reference is anticipatory.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

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4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
1. Claims 7, 9 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukuda et al (WO 02/15313).

The composition of the proton-conducting electrolyte membrane as set forth in rejection-3 under 35 USC 102(b) is herein incorporated. The prior art further teaches making of the membrane by forming a coating solution by mixing acid treated hectorite/smectite particles, a polymer and a solvent; treating of clays with sulfuric acid, and solution coating of a membrane (Col-4, Lines 1-2; Example-1). The prior art is silent about the removal of a solvent by drying that would be an obvious function to a person of ordinary skill in the art. With regard to claim-9, the prior art teaches treating the clay with the acid prior to forming the coating solution. With regard to claim-13, the prior art teaches treating the clay by soaking in the acid solution and coating the film whereby the limitations of acid site reacting with the clay and the presence of sulfo group on the surface, and the ratio of amount of acid to the presence of acid sites on the clay would be obvious.

Allowable Subject Matter

Claims 5-6, 8, 10 and 12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 4 and 11 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

The prior art of record neither teaches nor fairly suggest a proton conducting membrane having layered clay being crosslinked by sulfo groups, further clay with an anion exchanger and inserted acid, and a process of making the membranes by steps of the applicants.

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Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kallambella Vijayakumar whose telephone number is 571-272-1324. The examiner can normally be reached on 8-5.30 Mon-Thu, 8-4.30 Alt Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Yogendra Gupta can be reached on 571-272-1316. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KMV
December 01, 2005.


Mark Kopec
Primary Examiner